

## CLAIMS

1. A joined body of a first member made of a metal and a second member made of a ceramic or a cermet,  
wherein said joined body comprises a joining portion interposed between said first member and said second member for joining said first and second members,  
said joining portion comprising main phase contacting said first member and an intermediate ceramic composition layer contacting said second member and existing between said second member and said main phase, and  
said main phase comprising a porous bone structure with open pores and made of a sintered product of powder of a metal, and said main phase further comprising ceramic composition layer impregnated into said open pores in said porous bone structure  
each of said intermediate ceramic composition layer and said impregnated ceramic composition layer has a crystallinity of more than 50%.
2. The joined body of claim 1, wherein said intermediate ceramic composition layer and said impregnated ceramic composition layer contain a main component of said ceramic or said cermet constituting said second member.
3. The joined body of claims 1 or 2, wherein said metal constituting said porous bone structure contains a main component of said metal constituting said first member.
4. The joined body of any one of claims 1 to 3, wherein said intermediate ceramic composition layer and said impregnated ceramic composition layer are made of ceramic materials comprising the same ingredient system.

5. The joined body of any one of claims 1 to 4, wherein said porous bone structure has a porosity of open pores of not lower than 30% and not higher than 80%.

6. The joined body of any one of claims 1 to 5, wherein each of said intermediate ceramic layer and said impregnated ceramic phase has a crystallinity of not lower than 60%.

7. The joined body of claim 6, wherein each of said intermediate ceramic layer and said impregnated ceramic phase has a crystallinity of not lower than 70%.

8. The joined body of claim 7, wherein each of said intermediate ceramic layer and said impregnated ceramic phase has a crystallinity of not lower than 80%.

9. The joined body of any one of claims 1 to 8, wherein each of a ceramic constituting said intermediate ceramic composition layer and a ceramic constituting said impregnated ceramic composition layer comprises one or more oxide selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{Sc}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{La}_2\text{O}_3$ ,  $\text{Gd}_2\text{O}_3$ ,  $\text{Dy}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Tm}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{MoO}_2$  and  $\text{MoO}_3$ .

10. The joined body of claim 9, wherein each of a ceramic constituting said intermediate ceramic composition layer and a ceramic constituting said impregnated ceramic composition layer comprises three or more oxides selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{Sc}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{La}_2\text{O}_3$ ,  $\text{Gd}_2\text{O}_3$ ,  $\text{Dy}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Tm}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{MoO}_2$  and  $\text{MoO}_3$ .

11. The joined body of claim 10, wherein each ceramic has a content of  $\text{SiO}_2$  of not higher than 15 weight percent.

12. The joined body of claim 11, wherein each ceramic has a content of SiO<sub>2</sub> of not lower than 5ppm.

13. The joined body of any one of claims 1 to 12, wherein said first member comprises one or more metal selected from the group consisting of molybdenum, tungsten, rhenium, niobium, tantalum and the alloys thereof.

14. The joined body of any one of claims 1 to 13, wherein said second member comprises a ceramic selected from the group consisting of alumina, magnesia, yttria, lanthania and zirconia, or a cermet containing said ceramic.

15. The joined body of any one of claims 1 to 15, wherein each of a material constituting said intermediate ceramic composition layer and a ceramic constituting said impregnated ceramic composition layer has a melting point not more than a temperature subtracted 200°C from a melting point of a ceramic or a cermet constituting said second member.

16. A high pressure discharge lamp comprising:  
a ceramic discharge tube with an inner space formed therein and end portions, said inner space being filled with an ionizable light-emitting material and a starter gas and an opening being formed within said end portion;  
an electrode system provided within said inner space;  
a sealing member comprising a ceramic or a cermet with a through hole formed therein, at least a part of said sealing member being fixed within said opening of said ceramic discharge tube; and  
a metal member;

wherein said lamp comprises a joined body interposed between said metal member and said sealing member, and said joined body is a joined body of any one of claims 1 to 15, said metal member is said first member, and said sealing member is said second member.

17. A high pressure discharge lamp comprising:  
a ceramic discharge tube with an inner space formed therein and end portions, said inner space being filled with an ionizable light-emitting material and a starter gas and an opening being formed within said end portion;  
an electrode system provided within said inner space; and  
a metal member;  
wherein said lamp comprises a joined body interposed between said metal member and said discharge tube, and said joined body is a joined body of any one of claims 1 to 15, said metal member is said first member, and said discharge lamp is said second member.
18. The lamp of claims 16 or 17, wherein a heat resisting temperature of said discharge tube is not less than 1000°C
19. The lamp of claims 16 or 17, wherein said intermediate ceramic layer and said impregnated ceramic phase contain a main component of said ceramic constituting said discharge tube.
20. The lamp of claims 16 to 19, wherein said metal member has tubular shape, and a clearance between said metal member and an electrode to be inserted into said metal member is between 30 to 150 $\mu$ m at a diameter direction.